We claim:

1. A conveying lockhopper for use with a gasification system, said conveying lockhopper comprising:

a housing, said housing being elongated and inclined with spaced apart upper and lower ends;

an inlet aperture disposed at the lower end;

an outlet aperture disposed at the upper end;

an auger disposed within said housing, said auger being configured to convey slag from the lower end of said housing toward the upper end of said housing; and

wherein slag enters said housing through said inlet aperture, said auger conveys the slag towards said outlet aperture, and the slag exits said housing through said outlet aperture.

2. The conveying lockhopper of claim 1, wherein said housing is substantially cylindrical in shape and wherein a length of said housing is at least twice a diameter of said housing.

3. The conveying lockhopper of claim 1, wherein said inlet aperture is disposed beneath the gasification system.

4. The conveying lockhopper of claim 1, wherein said housing is inclined at an angle between approximately 5 degrees and approximately 60 degrees, with respect to a horizontal position.

5. The conveying lockhopper of claim 1, wherein said housing is capable of being pressurized.

6. The conveying lockhopper of claim 1, further comprising:

a motor for rotating said auger;

a bearing for supporting said auger; and

wherein said auger comprises a shaft that extends through an opening in said housing, said motor being coupled to said shaft.

7. The conveying lockhopper of claim 6, wherein said motor is a hydraulic drive motor.

8. The conveying lockhopper of claim 6, wherein said motor is a variable speed motor.

9. The conveying lockhopper of claim 6, wherein said motor is reversible.

10. The conveying lockhopper of claim 6, wherein said bearing comprises:

an upper bearing for supporting said auger at the upper end of said housing; and

a lower bearing for supporting said auger at the lower end of said housing.

11. The conveying lockhopper of claim 10, wherein said upper bearing is a fixed pillow bearing.

12. The conveying lockhopper of claim 10, wherein said lower bearing is a thrust bearing.

13. The conveying lockhopper of claim 6, further comprising a shroud substantially encasing said bearing.

14. The conveying lockhopper of claim 13, wherein said shaft penetrates said shroud, and wherein an opening is formed between said shaft and said shroud where said shaft penetrates said shroud.

15. The conveying lockhopper of claim 14, wherein said opening between said shaft and said shroud is between approximately 0.025 inches and approximately 0.25 inches.

16. The conveying lockhopper of claim 6, further comprising a purge inlet into which fluid is passed to purge said bearing.

17. The conveying lockhopper of claim 6, further comprising a lubricant plug such that lubricant can be added to said bearing.

18. The conveying lockhopper of claim 6, wherein said housing comprises a seal where said shaft of said auger extends through the opening in said housing.

19. The conveying lockhopper of claim 18, wherein said seal is a double mechanical seal.

20. The conveying lockhopper of claim 18, wherein said seal is a packing seal.

21. The conveying lockhopper of claim 18, further comprising a means for purging said seal.

22. The conveying lockhopper of claim 18, further comprising a tube configured to deliver a fluid to a location where said shaft of said auger extends through the opening in said housing.

23. The conveying lockhopper of claim 1, wherein said auger comprises a rotatable shaft and a plurality of flights, said flights being configured on said shaft to convey the slag along the length of the housing as said shaft rotates.

24. The conveying lockhopper of claim 23 wherein a pitch of said flights is between approximately 0.5 times and approximately 1.0 times a diameter of said housing.

25. The conveying lockhopper of claim 23, wherein said auger further comprises a plurality of reversed flights at the upper end, said reversed flights being configured on said shaft in a direction opposite to said flights.

26. The conveying lockhopper of claim 25, wherein said flights and said reversed flights are both configured to convey slag toward said outlet aperture.

27. The conveying lockhopper of claim 23, wherein said plurality of flights comprises a perforated flight.

28. The conveying lockhopper of claim 23, wherein said plurality of flights comprises a slotted flight.

29. The conveying lockhopper of claim 23, wherein said plurality of flights comprises a notched flight.

30. The conveying lockhopper of claim 23, wherein said plurality of flights comprises a partially truncated flight.

31. The conveying lockhopper of claim 23, wherein said plurality of flights comprises flights of different thicknesses.

32. The conveying lockhopper of claim 31, wherein at least one of said plurality of flights has a thickness greater than the thickness of the remaining flights, and wherein said at least one flight is disposed at a lower end of said shaft.

33. The conveying lockhopper of claim 31, wherein a flight nearest to the lower end has the greatest thickness, a flight nearest to the upper end has the least thickness, and wherein the thickness of said flights decreases along the length of said shaft.

34. The conveying lockhopper of claim 1, further comprising a pipe for storing slag prior to discharge.

35. The conveying lockhopper of claim 34, wherein said pipe receives slag from said outlet.

36. The conveying lockhopper of claim 34, wherein said pipe is capable of being pressurized.

37. A conveying lockhopper for use with a gasification system, said conveying lockhopper comprising:

a housing, said housing being substantially cylindrical in shape and inclined with spaced apart upper and lower ends;

an inlet aperture disposed at the lower end of said housing and configured to receive slag from the gasification system;

an outlet aperture disposed at the upper end of said housing;

a rotatable shaft disposed within said housing, said shaft comprising a plurality of threads, said threads being configured on said shaft to convey the slag from the lower end of said housing toward the upper end of said housing as said shaft rotates; and

wherein slag enters said housing through said inlet aperture, said shaft conveys the slag towards said outlet aperture, and the slag exits said housing through said outlet aperture.

38. The conveying lockhopper of claim 37, wherein a length of said housing is at least twice a diameter of said housing.

39. The conveying lockhopper of claim 37, wherein said housing is inclined at an angle between approximately 5 degrees and approximately 60 degrees, with respect to a horizontal position.

40. The conveying lockhopper of claim 37, wherein said housing is capable of being pressurized.

41. The conveying lockhopper of claim 37, further comprising:

a motor for rotating said shaft, said motor being disposed outside of said housing;

an upper bearing for supporting said shaft at the upper end of said housing;

a lower bearing for supporting said shaft at the lower end of said housing; and

wherein said shaft extends through an opening in one of the ends of said housing, said motor being coupled to said shaft.

42. The conveying lockhopper of claim 41, wherein said upper bearing is a fixed pillow bearing.

43. The conveying lockhopper of claim 41, wherein said lower bearing is a thrust bearing.

44. The conveying lockhopper of claim 41, further comprising a shroud substantially encasing said lower bearing.

45. The conveying lockhopper of claim 44, wherein said shaft penetrates said shroud, and wherein an opening is formed between said shaft and said shroud where said shaft penetrates said shroud.

46. The conveying lockhopper of claim 45, wherein said opening between said shaft and said shroud is between approximately 0.025 inches and approximately 0.25 inches.

47. The conveying lockhopper of claim 41, further comprising a purge inlet into which fluid is passed to purge said lower bearing.

48. The conveying lockhopper of claim 41, further comprising a lubricant plug such that lubricant can be added to said lower bearing.

49. The conveying lockhopper of claim 41, wherein said motor is a hydraulic drive motor.

50. The conveying lockhopper of claim 41, wherein said motor is a variable speed motor.

51. The conveying lockhopper of claim 41, wherein said motor is reversible.

52. The conveying lockhopper of claim 41, wherein said housing comprises a seal at the end where said shaft extends through the end of said housing.

53. The conveying lockhopper of claim 47, wherein said seal is a double mechanical seal.

54. The conveying lockhopper of claim 47, wherein said seal is a packing seal.

55. The conveying lockhopper of claim 47, further comprising a means for purging said seal.

56. The conveying lockhopper of claim 47, further comprising a tube configured to deliver a fluid to a location where said shaft of said auger extends through the opening in said housing.

57. The conveying lockhopper of claim 37 wherein a pitch of said threads is between approximately 0.5 times and approximately 1.0 times a diameter of said housing.

58. The conveying lockhopper of claim 37, wherein said shaft further comprises a plurality of reversed threads at the upper end, said reversed threads being configured on said shaft in a direction opposite to said threads.

59. The conveying lockhopper of claim 58, wherein said threads and said reversed threads are both configured to convey slag toward said outlet aperture.

60. The conveying lockhopper of claim 37, wherein said plurality of threads comprises a perforated thread.

61. The conveying lockhopper of claim 37, wherein said plurality of threads comprises a slotted thread.

62. The conveying lockhopper of claim 37, wherein said plurality of threads comprises a notched thread.

63. The conveying lockhopper of claim 37, wherein said plurality of threads comprises a partially truncated thread.

64. The conveying lockhopper of claim 37, wherein said plurality of threads comprises threads of different thicknesses.

65. The conveying lockhopper of claim 64, wherein at least one of said plurality of threads has a thickness greater than the thickness of the remaining threads, and wherein said at least one thread is disposed at a lower end of said shaft.

66. The conveying lockhopper of claim 64, wherein a thread nearest to the lower end has the greatest thickness, a thread nearest to the upper end has the least thickness, and wherein the thickness of said threads decreases along the length of said shaft.

67. The conveying lockhopper of claim 37, further comprising a pipe for storing slag prior to discharge.

68. The conveying lockhopper of claim 67, wherein said pipe receives slag from said outlet.

69. The conveying lockhopper of claim 67, wherein said pipe is capable of being pressurized.

70. An apparatus for moving material, said apparatus comprising:

a conveyor, said conveyor being inclined and having spaced apart ends;

an inlet disposed at one end of said conveyor, said inlet configured to receive the material;

an outlet disposed at the other end of said conveyor, said outlet being configured to expel the material from said conveyor; and

wherein the material is introduced to said conveyor by way of said inlet, said conveyor transports the material toward said outlet, and the material is expelled from said conveyor through said outlet.

71. The apparatus of claim 70, wherein said inlet is configured to receive the material from a gasification system.

72. The apparatus of claim 70, wherein said conveyor comprises:

a housing, said housing being elongated with spaced apart ends;

an auger disposed within said housing, said auger being configured to convey the material from said inlet of said conveyor toward said outlet of said conveyor;

wherein said inlet is disposed at an inlet end of said housing and said outlet is disposed at an outlet end of said housing; and

wherein the material enters said housing through said inlet, said auger conveys the material towards said outlet, and the material exits said housing through said outlet.

73. The apparatus of claim 72, wherein said housing is substantially cylindrical in shape and wherein a length of said housing is at least twice a diameter of said housing.

74. The apparatus of claim 72, wherein said housing is capable of being pressurized.

75. The apparatus of claim 72, further comprising:

a motor configured to rotate said auger;

a bearing for supporting said auger; and

wherein said auger comprises a shaft that extends through an opening in said housing, said motor being coupled to said shaft.

76. The apparatus of claim 75, wherein said motor is a hydraulic drive motor.

77. The apparatus of claim 75, wherein said motor is a variable speed motor.

78. The apparatus of claim 75, wherein said motor is reversible.

79. The apparatus of claim 75, wherein said bearing comprises:

an inlet bearing for supporting said auger at the inlet end of said housing; and

an outlet bearing for supporting said auger at the outlet end of said housing.

80. The apparatus of claim 79, wherein said inlet bearing is a thrust bearing.

81. The apparatus of claim 75, further comprising a shroud substantially encasing said bearing.

82. The apparatus of claim 81, wherein said shaft penetrates said shroud, and wherein an opening is formed between said shaft and said shroud where said shaft penetrates said shroud.

83. The apparatus of claim 82, wherein said opening between said shaft and said shroud is between approximately 0.025 inches and approximately 0.25 inches.

84. The apparatus of claim 75, further comprising a purge inlet into which fluid is passed to purge said bearing.

85. The apparatus of claim 75, further comprising a lubricant plug such that lubricant can be added to said bearing.

86. The apparatus of claim 79, wherein said outlet bearing is a fixed pillow bearing.

87. The apparatus of claim 79, wherein said housing comprises a seal where said shaft of said auger extends through the opening in said housing.

88. The apparatus of claim 82, wherein said seal is a double mechanical seal.

89. The apparatus of claim 82, wherein said seal is a packing seal.

90. The apparatus of claim 82, further comprising a means for purging said seal.

91. The apparatus of claim 82, further comprising a tube configured to deliver a fluid to a location where said shaft of said auger extends through the opening in said housing.

92. The apparatus of claim 72, wherein said auger comprises a rotatable shaft and a plurality of flights, said flights being configured on said shaft to convey the material along the length of the housing as said shaft rotates.

93. The apparatus of claim 87 wherein a pitch of said flights is between approximately 0.5 times and approximately 1.0 times a diameter of said housing.

94. The apparatus of claim 87, wherein said auger further comprises a plurality of reversed flights at the outlet end of said housing, said reversed flights being configured on said shaft in a direction opposite to said flights.

95. The apparatus of claim 89, wherein said flights and said reversed flights are both configured to convey the material toward said outlet.

96. The apparatus of claim 89, wherein said plurality of flights comprises a perforated flight.

97. The apparatus of claim 89, wherein said plurality of flights comprises a slotted flight.

98. The apparatus of claim 89, wherein said plurality of flights comprises a notched flight.

99. The apparatus of claim 89, wherein said plurality of flights comprises a partially truncated flight.

100. The apparatus of claim 89, wherein said plurality of flights comprises flights of different thicknesses.

101. The apparatus of claim 100, wherein at least one of said plurality of flights has a thickness greater than the thickness of the remaining flights, and wherein said at least one flight is disposed on said shaft at the inlet end of said housing.

102. The apparatus of claim 100, wherein a flight nearest to the inlet end has the greatest thickness, a flight nearest to the outlet end has the least thickness, and wherein the thickness of said flights decreases along the length of said shaft.

103. The apparatus of claim 70, wherein said conveyor is inclined such that said outlet is at a higher elevation than said inlet.

104. The apparatus of claim 103, wherein said conveyor is inclined at an angle between approximately 5 degrees and approximately 60 degrees, with respect to a horizontal position.

105. The apparatus of claim 70, further comprising a buffer for storing material prior to discharge.

106. The apparatus of claim 105, wherein said buffer receives material from said outlet.

107. The apparatus of claim 105, wherein said buffer is capable of being pressurized.

108. A system for withdrawing and dewatering slag from gasification equipment, said system comprising:

a gasifier for producing syngas from feedstocks;

an injector for injecting feedstocks and oxygen into said gasifier;

a syngas cooling apparatus for receiving and cooling the syngas;

a conveying lockhopper configured to receive slag from said syngas cooling apparatus, said conveying lockhopper being configured at an inclination to receive the slag from said syngas

cooling apparatus at a first elevation and expel the slag at a second elevation that is greater than the first elevation.

109. The system of claim 108, wherein said conveying lockhopper is inclined at an angle between approximately 5 degrees and approximately 60 degrees, with respect to a horizontal position.

110. The system of claim 108, wherein said conveying lockhopper comprises:

a housing, said housing being elongated and inclined with upper and lower spaced apart ends;

an inlet aperture disposed at the lower end;

an outlet aperture disposed at the upper end;

an auger disposed within said housing; and

wherein slag enters said housing through said inlet aperture, said auger conveys the slag towards the outlet aperture, and the slag exits said housing through said outlet aperture.

111. The system of claim 110, wherein said housing is capable of being pressurized.

112. The system of claim 110, wherein the pressure inside said conveying lockhopper is approximately equal to the pressure within said gasifier.

113. The system of claim 110, wherein said auger comprises a rotatable shaft and a plurality of flights, said flights being configured on said shaft to convey the slag along the length of the housing as said shaft rotates.

114. The system of claim 113, wherein said auger further comprises a plurality of reversed flights at the upper end, said reversed flights being configured on said shaft in a direction opposite to said flights.

115. The system of claim 114, wherein said flights and said reversed flights are both configured to convey the slag toward said outlet aperture.

116. The system of claim 113, wherein said plurality of flights comprises flights of different thicknesses.

117. The system of claim 113, wherein at least one of said plurality of flights has a thickness greater than the thickness of the remaining flights, and wherein said at least one flight is disposed at a lower end of said shaft.

118. The system of claim 110, further comprising a pipe for storing slag prior to discharge.

119. The system of claim 118, wherein said pipe receives slag from said outlet.

120. The system of claim 118, wherein said pipe is capable of being pressurized.

121. The system of claim 108, further comprising a processor coupled to said conveying lockhopper.

122. A method of withdrawing and dewatering slag from a gasification system, said method comprising:

receiving slag from the gasification system into an inlet of a conveying lockhopper;

conveying the slag from the inlet of the conveying lockhopper to an outlet of the conveying lockhopper, wherein the outlet is at a higher elevation than the inlet; and

discharging the slag from the outlet.

123. The method of claim 122, wherein said step of receiving slag comprises opening a valve at the inlet to enable slag to collect in the conveying lockhopper.

124. The method of claim 122, wherein said step of receiving slag comprises closing a valve at the outlet.

125. The method of claim 122, wherein during said step of receiving slag, the pressure within the conveying lockhopper is approximately the same as the pressure within the gasification system.

126. The method of claim 122, wherein said step of conveying the slag comprises rotating an auger disposed in the conveying lockhopper to convey the slag from the inlet to the outlet.

127. The method of claim 126, wherein said step of conveying the slag further comprises rotating the auger at a rotational speed between approximately 0.25 revolutions per minute and approximately 10 revolutions per minute.

128. The method of claim 122, wherein said step of conveying the slag comprises conveying the slag to a buffer for storage prior to discharge.

129. The method of claim 128, wherein the buffer receives slag from the outlet.

130. The method of claim 122, wherein said step of discharging the slag comprises:

closing a valve at the inlet of the conveying lockhopper; and

opening a valve at the outlet of the conveying lockhopper.

131. The method of claim 122, wherein said step of discharging the slag comprises forcing a fluid from the conveying lockhopper into a tank coupled to the conveying lockhopper.

132. The method of claim 131, wherein said step of discharging the slag further comprises using an inert gas to force the fluid from the conveying lockhopper into the tank.

133. The method of claim 132, wherein the inert gas is nitrogen.

134. The method of claim 131, wherein the tank is an atmospheric heel tank.

135. The method of claim 131, wherein the tank is a quench chamber of the gasification system.

136. The method of claim 131, wherein the tank is a syngas cooling apparatus of the gasification system.

137. The method of claim 122, further comprising depressurizing the conveying lockhopper prior to said step of discharging the slag.

138. The method of claim 122, further comprising the step of adding a fluid to the conveying lockhopper from a tank coupled to the conveying lockhopper.

139. The method of claim 122, further comprising the step of pressurizing the conveying lockhopper to approximately the same pressure as the pressure within the gasification system.

140. The method of claim 139, wherein said step of pressurizing the conveying lockhopper is carried out using an inert gas.

141. The method of claim 140, wherein the inert gas is nitrogen.

142. The method of claim 122, wherein said step of discharging the slag comprises:

closing a valve at the inlet of a slag storage buffer; and

opening a valve at the outlet of the slag storage buffer.

143. The method of claim 142, further comprising depressurizing the slag storage buffer prior to said step of discharging the slag.

144. The method of claim 122, further comprising the step of pressurizing a slag storage buffer to approximately the same pressure as the pressure within the conveying lockhopper.

145. The method of claim 144, wherein said step of pressurizing the slag storage buffer is carried out using an inert gas.

146. The method of claim 145, wherein the inert gas is nitrogen.